BLS Curriculum Update Committee
Marriott West-Richmond, Virginia
November 27, 2007
10:30am

Members Present:	Members Absent:	Staff:	Others:
Linda Johnson	Shaun Carpenter-Excused	Greg Neiman	**Holly Sturdevant**
Pat Mercer	Ray George-Excused		
Cookie Conrad	Ron Early-Excused		
Debbie Akers	Russell Barnes		
Jay Porter	David Morris		
Rob Phillips	Theresa Kingsly		
Carla Mann	Tracey Jarrett-Excused		

Topic/Subject	Discussion	Recommendations, Action/Follow-up; Responsible Person
I. Welcome	The meeting was called to order at 1050	
II. Introductions	Members of the committee introduced themselves	
III. Approval of Minutes	The committee reviewed the minutes from the September 5, 2007 meeting. (**ATTACHMENTA**)	**Motion by: Jay Porter** **To approve the minutes as presented.** **Seconded By: Debbie Akers** **Vote: Unanimously approved**
IV. Review of Assignments	The committee reviewed the document forwarded from Shaun Carpenter (**ATTACHMENTS B & C**)	

Topic/Subject	Discussion	Recommendations, Action/Follow-up; Responsible Person
V. General Discussions and Ideas	The committee discussed the Educational Standards and the implementation timetable of the items it has been working on. Even if everything was put together today and implementation was set for July 1, 2008, the Standards would be rolled out soon after and the committee would have to start again. Discussion continued about realigning the purpose of the committee.	**Motion by: Jay Porter** **That Linda go back to PDC and ask them to allow the committee to set aside the current work and refocus on the Education Standards and begin planning for implementation in Virginia.** **Seconded by; Carla Mann** **Vote: Unanimously approved**
VI. Assignments for the next Meeting	The Committee will review the Draft 2.0 Education Standards (Greg will send the web address) Committee members should prepare your comment documents and send them to Greg by January 30, 2008. Debbie Akers has already submitted her comments and will share them with the Committee.	
VII. Establish next meeting date	Thursday, February 21st, 2008 10:00am	
VIII. Adjourn	The committee adjourned at 1400	

BLS Curriculum Update Committee
Tuesday November 27, 2007 – 10:30am
Location: Marriott West - Richmond
Agenda

I. Welcome

II. Introductions

III. Approval of Minutes from September 5, 2007

IV. Review of Assignments

V. General Discussions and Ideas

VI. Assignments for Next Meeting

VII. Establish Next Meeting Date

VIII. Adjourn

Minutes of the November 27, 2007 BLS Curriculum Update Committee Meeting ATTACHMENT: A

September 5, 2007 Minutes of the BLS Curriculum Update Committee

BLS Curriculum Update Committee
Marriott West - Richmond, Virginia
September 5, 2007
10:30 am

Members Present:	Members Absent:	Staff:	Others:
Linda Johnson-Chair	Russell Barnes-Excused	Greg Neiman	Holly Sturdevant
Jay Porter	Tracey Jarrett-Excused		
Cookie Conrad	Pat Mercer-Excused		
Ronnie Early	Carla Mann		
Ray George	Rob Phillips		
Shaun Carpenter	David Morris		
Debbie Akers	Theresa Kingsly		

Topic/Subject	Discussion	Recommendations, Action/Follow-up; Responsible Person
I. Welcome	The meeting was called to order at 10:45am	
II. Introductions	The committee and guests introduced themselves.	
III. Approval of Minutes	The Committee reviewed the draft Minutes from the June 21, 2007 meeting. (**Attachment A**)	**Motion by: Ronnie Early** **To: Approve the minutes as presented.** **Second By: Shaun Carpenter** **Motion approved Unanimously**
	The Committee reviewed the draft Minutes from the May 1, 2007 meeting. (**Attachment B**)	**Motion by: Ronnie Early** **To: Approve the minutes as corrected.** **Second By: Jay Porter** **Motion approved Unanimously**
IV. Review of Assignments	The committee discussed Shaun Carpenter's presentation at the July PDC/MDC meetings and the National Education Standards.	
V. General Discussion and Ideas	The Committee discussed items that should be incorporated to update the curriculum. Aspirin, Blood Glucose, NTG Paste, Pulse Ox, Beta 2 Agonist, 12 Lead application/obtained (?)	
Break for Lunch @ 1200		

Topic/Subject	Discussion	Recommendations, Action/Follow-up; Responsible Person
Returned from break @1230		
VI. Assignments for Next Meeting	Shaun Carpenter will compile all of the documents and send them out to the Committee Members for review. Comments will be due September 30, 2007so that Shaun can compile and forward to Greg Neiman to be sent to PDC members prior to their October Meeting.	
VII. Establish Meeting Dates	Friday, October 26th, 10:30am Location TBA	
VIII. Adjourn	Motion to adjourn 12:35 pm	

BLS Curriculum Update Committee
Tuesday, September 5, 2007 – 10:30am
Richmond Marriott West - Innsbrook
Agenda

IX. Welcome

X. Introductions

XI. Approval of Minutes from June 21, 2007

XII. Review of Assignments

XIII. General Discussions and Ideas

XIV. Assignments for Next Meeting

XV. Establish Meeting Dates

XVI. Adjourn

Minutes of the November 27, 2007 BLS Curriculum Update Committee Meeting ATTACHMENT: B

DRAFT-Curriculum Update Report Submitted by Shaun Carpenter for Committee Review

Notes for 11/27/2007 BLS Curriculum Meeting

1. The PDC wants to keep the update simple and short. While we did not make it on the agenda at the PDC, I spoke with many of the docs afterwards, and was told to go ahead with the following additions.
    a. Nitroglycerin for Chest Pain – ability for EMT to use on-board NTG if pt has current prescription but no NTG
    b. Gluometry
    c. Definitive Pulse Oximiter Objectives
    d. Use of Hand Held Nebulizer (HHN) for B_2 agonist

2. Based on our previous work I compiled Instructor Guides for Glucometry and Aspirin Admin (Thanks to Carl on these)
    a. I did not put "lesson time" in the guides as I am about to propose a very structured education format

3. We should create a variety of materials for the update with the idea to provide EMT-Instructors with all of the tools they will need to teach the material
    a. Instructor Guides
    b. Student Resource Manuals
        i. Brief explanation of objectives and theories of practice (with references)

    Many of the EMS texts cover these guidelines although some do not. OEMS can not endorse one text over another. We need to put together a short manual explaining the how and why of things to supplement this problem. (I have a sample from the CSEMS local protocol program)

    c. Pre-made PowerPoint presentations
    d. An EMSAT video to "update" providers in the field and to be used as a classroom resource

4. We should also consider updating the BLS/AED. We should clarify the 2005 AHA guidelines and change the focus of the AED Testing station
    a. We can look for consistency among the regions
    b. The biggest discrepancy will be the end of the AED algorithm (when to stop/transport). Solve this by saying "consider transportation/termination with medical control after ___ minutes of CPR"
    c. We should focus on 2 – provider; witnessed and un-witnessed CPR.
        i. Regions are probably not going to be clear on the end of things but we should renew the attention to AED use and the initiation of good CPR.
5. Look at the CSEMS student resource for the use of the AED. I know it contains a lot of CSEMS stuff.
    a. Do like the Idea of a Student handbook of sorts?
    b. Do you think we could find enough commonality between the regions to stress good CPR?
6. Implementation and stuff
    a. Greg will have to refresh my memory about the implementation schedule
    b. I am interested in creating a symposium class to release this info.
    c. Webinars work great for me can we start doing some more of them or some round robin email?

Thanks for your time,

Shaun

Glucometry Instructor Guide

C=Cognitive P=Psychomotor A=Affective
1 = Knowledge level
2 = Application level
3 = Problem-solving level

Cognitive Objectives

1. **Review the anatomy and physiology specific to blood glucose sampling (C-1).**
2. **Review the equipment used in blood glucose sampling (C-1).**
3. **Discuss calibration of instrument and equipment utilized (C-1).**
4. **Discuss the need for asepsis during the procedure (C-1).**
5. **Differentiate between the numeric values and patient presentation, signs and symptoms, and history.**

Psychomotor Objectives

1. **Use universal precautions and BSI procedures during blood glucose monitoring (P-2).**
2. **Demonstrate medical asepsis during blood glucose monitoring (P-**
3. **Demonstrate ability to accuratley obtain blood glucose (P-3).**
4. **Perfect disposal of contaminated items and sharps (P-3).**

Affective Objectives

1. **Serve as a model for medical asepsis (A-3).**
2. **Serve as a model for disposing of contaminated sharps and items (A-3).**
3. **Serve as a model for patient advocacy by recognizing the glucometer as a tool but treating the patient based on condition, signs and symptoms, and history (A-2).**
4. **Defend choice of medication and treatment plan based on glucometry as a tool (A-3).**

Declarative – What

I. **Glucometry**
   a. **Indications**
      i. **Altered mental status**
      ii. **History of diabetes**
      iii. **Patient does not meet administration guidleines for oral glucose**
   b. **Contraindications**

i. **Glucometry would cause a delay in critical life saving interventions.**
ii. **Competent patient refuses treatment.**
iii. **Unknown device or not trained on device.**
iv. **History of device unsure or unknown (when last calibrated).**

c. **Components of device**
   i. **Case**
   ii. **Glucometer**
      1. **Screen**
      2. **Control chip**
   iii. **Glucose reading strips**
      1. **Code associated with strips**
      2. **Maintaining integrity of strips**
      3. **Meaning of "Hi" and "Lo"**

d. **Calibation of device**
   i. **Control solutions**
      1. **Expiration**

e. **Obtaining blood glucose sample**
   i. **Medical asepsis**
   ii. **Site selection**
   iii. **Obtaining a sample**
      1. **Prepare the device including a test strip and lancet.**
      2. **Use an alcohol prep to cleanse the patient's finger.**
      3. **After allowing the alcohol to dry**
      4. **Use the lancet to perform a finger stick on the patient. Wipe away the first drop of blood that appears.**
      5. **Squeeze the finger if necessary to get a second drop of blood. Holding the hand lower than the heart and warming the hand may increase blood flow.**
      6. **Apply the blood to the test strip. This is often done by holding the strip up to the finger and then drawing the blood into the strip.**
      7. **The blood glucose meter analyzes the sample and provides a reading—usually in less than a minute.**
   iv. **Disposal of sharps**
   v. **Recording of Findings**
      1. **SAMPLE history**
      2. **dose(s) and route(s) used**
      3. **effect on patient**
      4. **physician signature**

Equipment Requirements

- Glucometer
- Test strips
- Lancets
- Alcohol preps
- Gloves
- Sharps container
- Oral glucose
- Skill Sheet

EMT-BASIC PROFICIENCY RECORD

BLOOD GLUCOSE MONITORING

STUDENT NAME: _____ **DATE: _____**

EVALUATOR NAME: _____ **INITIALS: _____**

DESIRED ACTION OR MANEUVER BY STUDENT	POINTS	A	B
Consideration of body substance isolation precautions	1		
Selects appropriate equipment to include glucometer, test strip, lancet, alcohol prep and band-aid	5		
Explains procedure to patient as possible	1		
Inquires as to patients known drug allergies/sensitivities	1		
Selects an appropriate site for puncture	1		
Cleanses site prior to puncture	1		
Uses fingers to stabilize puncture site while maintaining aseptic field	1		
Correctly makes puncture and disposes of sharp(s) in approved container	2		
Appropriately saturates or applies blood to test strip (may vary by device, check manufacturers instructions)	1		
Appropriately covers or bandages puncture site with a sterile dressing or band-aid	1		
Correctly interprets situation/scenario based on patient presentation and incorporation of blood glucose results as a diagnostic tool	2		
Observes patient	1		
POSSIBLE POINTS/TOTAL POINTS	**18**		

CRITICAL CRITERIA

_____ ***FAILURE TO TAKE BSI PRECAUTIONS***
_____ ***CONTAMINATES PUNCTURE SITE WITHOUT TAKING CORRECTIVE ACTION***
_____ ***FAILS TO DISPOSE OF SHARP(S) IN PROPER CONTAINER***
_____ ***USES INCORRECT SIZE SYRINGE AND/OR NEEDLE***

If any of the above is checked it constitutes an immediate failure of the skill, the scenarios are determined in advance and may not be argued.

The column marked "A" is to be used while the student is "Gaining Proficiency", once the student is deemed to be proficient in this skill the "B" column should be used from that point forward. Proficiency is attaining 80% of the possible total points allowed AND not violating any "Critical Criteria." The "B" column represents "Competency Achieved"

Aspirin Instructor Guide

C=Cognitive P=Psychomotor A=Affective
1 = Knowledge level
2 = Application level
3 = Problem-solving level

Cognitive Objectives

1. **List the dosage, use, route, and packaging of aspirin (C-1).**
2. **List the indications for use of aspirin (C-1).**
3. **State the contraindications and side effects for the use of aspirin (C-1).**

Psychomotor Objectives

1. **Perform the steps in facilitating the use of aspirin for chest pain or discomfort. (P-2)**
2. **Demonstrate the assessment and documentation of patient response to aspirin. (P-1, P-2).**

Affective Objectives

1. **Explain the rationale for administering aspirin to a patient with chest pain or discomfort (A-3).**

Declarative – What

I. **Aspirin**
   a. **Medication Name**
      i. **Generic-aspirin, acetylsalicylic acid**
      ii. **Trade - Bayer, St. John's**
   b. **Indications**
      i. **Exhibits signs and symptoms of chest pain of cardiac origin**
      ii. **Has no contraindications for aspirin administration**
   c. **Contraindications**
      i. **Active or recent history of upper/lower gastrointestinal bleed.**
      ii. **Known allergy to aspirin or other NSAIDS**
      iii. **Infants and children**
      iv. **History of asthma, cloting disorders**
      v. **Patient has taken aspirin within 4 hours prior to contact by EMS**
   d. **Medication form - Chewable tablets**
   e. **Doasge - single dose, 81- 324mg (1 to 4 - 81mg tablets)**
   f. **Administration**
      i. **Perform focused assessment for the cardiac patient**
      ii. **Contact medical control if no standing orders**
      iii. **Assure right medication, right patient, right route, right time, right dose, right documentation**

iv. **Check expiration of medication**
v. **Ask patient to chew and swallow medication.**
vi. **Record activity and time.**
vii. **Perform reassessment.**

g. **Action - decreases platelet aggregation**
h. **Side Effects**
i. **Anaphylaxis**
ii. **Allergic Reaction**
iii. **Hypotension**
iv. **Asthmatic event**
v. **Bronchospasm**

i. **Reassessment strategies**
i. **Ask patient about effect on pain relief.**
ii. **Repeat vitals**

j. **Record reassessment results.**
i. **SAMPLE history**
ii. **dose(s) and route(s) used**
iii. **effect on patient**
iv. **physician signature**

Equipment Requirements

1. Simulated aspirin (Tic-Tacs)
2. Gloves
3. Skill Sheet

EMT-BASIC PROFICIENCY RECORD

PO MEDICATION ADMINISTRATION

STUDENT NAME: _____ **DATE: _____**

EVALUATOR NAME: _____ **INITIALS: _____**

DESIRED ACTION OR MANEUVER BY STUDENT	POINTS	A	B
Consideration of body substance isolation precautions	1		
Selects ordered/appropriate medication and checks for correct dose/concentration, sealed package, clarity/color, and expiration	5		
Repeats medication order to evaluator	1		
Inquires as to patients known drug allergies/sensitivities	1		
Instructs patient in regards to taking or assisting with medication, desired effects, and adverse side effects to be aware of.	3		
Administers ordered dose.	1		
Observes patient for desired effects and/or adverse effects	2		
POSSIBLE POINTS/TOTAL POINTS	14		

CRITICAL CRITERIA

_____ ***FAILURE TO TAKE BSI PRECAUTIONS***
_____ ***FAILURE TO REPEAT DRUG ORDER TO EVALUATOR***
_____ ***FAILURE TO ASK ABOUT KNOWN DRUG ALLERGIES***
_____ ***FAILURE TO ENSURE QUALITY OF SELECTED DRUG PRIOR TO ADMINSTRATION***

If any of the above is checked it constitutes an immediate failure of the skill, the scenarios are determined in advance and may not be argued.

The column marked "A" is to be used while the student is "Gaining Proficiency", once the student is deemed to be proficient in this skill the "B" column should be used from that point forward. Proficiency is attaining 80% of the possible total points allowed AND not violating any "Critical Criteria." The "B" column represents "Competency Achieved"

ASPIRIN SKILL SHEET

Candidate: _____ Examiner: _____ Date: _____

	Required	Earned
Verbalizes appropriate indications/contraindications for use of aspirin	**1**	
Takes or verbalizes body substance isolation procedures	**1**	
Obtains aspirin… Ensures medication is not expired	**1**	
Verifies that patient will be able to safely ingest oral medicines	**1**	
Explains procedure to patient	**1**	
Gives patient medicine and instructs patient to chew/swallow	**1**	
Assesses patient response to the medication	**1**	
Verbalizes documentation of procedure	**1**	
Passing Score: 6 points **Total:**	**8**	

Critical Criteria:

_____ Did not administer medication within three (3) minutes of the start of the scenario.

_____ Administers medication in a manner that may be harmful to the patient.

Module 1: Early Defibrillation (AED)

Introduction

Sudden cardiac arrest (SCA) is a leading cause of death in the United States and Canada. At the first analysis of heart rhythm, about 40% of victims of out-of-hospital SCA demonstrate ventricular fibrillation (VF). VF is characterized by chaotic rapid depolarizations and repolarizations that cause the heart to quiver so that it is unable to pump blood effectively. It is likely that an even larger number of SCA victims have VF or rapid ventricular tachycardia (VT) at the time of collapse, but by the time of first rhythm analysis the rhythm has deteriorated to asystole.

Many SCA victims can survive if bystanders act immediately while VF is still present, but successful resuscitation is unlikely once the rhythm deteriorates to asystole. Treatment for VF SCA is immediate CPR plus delivery of a shock with a defibrillator. The mechanism of cardiac arrest in victims of trauma, drug overdose, drowning, and in many children is asphyxia. CPR with both compressions and rescue breaths is critical for resuscitation of these victims.

The American Heart Association uses four links in a chain, the "Chain of Survival," to illustrate the important time-sensitive actions for victims of VF SCA. Three and possibly all four of these links are also relevant for victims of asphyxial arrest. These links are:

- Early recognition of the emergency and activation of the emergency medical services (EMS) or local emergency response system: "phone 911."
- Early bystander CPR: immediate CPR can double or triple the victim's chance of survival from VF SCA.
- Early delivery of a shock with a defibrillator: CPR plus defibrillation within 3 to 5 minutes of collapse can produce survival rates as high as 49% to 75%.
- Early advanced life support followed by postresuscitation care delivered by healthcare providers.

Bystanders can perform three of the four links in the Chain of Survival. When bystanders recognize the emergency and activate the EMS system, they ensure that basic and advanced life support providers are dispatched to the site of the emergency. In many communities the time interval from EMS call to EMS arrival is 7 to 8 minutes or longer. This means that in the first minutes after collapse the victim's chance of survival is in the hands of bystanders.

Victims of cardiac arrest need immediate CPR. CPR provides a small but critical amount of blood flow to the heart and brain. CPR prolongs the time VF is present and increases the likelihood that a shock will terminate VF (defibrillate the heart) and allow the heart to resume an effective rhythm and effective systemic perfusion. CPR is especially important if a shock is not delivered for four or more minutes after collapse. Defibrillation does not "restart" the heart; defibrillation "stuns" the heart, briefly stopping VF and other cardiac electrical activity. If the heart is still viable, its normal pacemakers may then resume firing and produce an effective ECG rhythm that may ultimately produce adequate blood flow.

In the first few minutes after successful defibrillation, asystole or bradycardia may be present and the heart may pump ineffectively. In one recent study of VF SCA, only 25% to 40% of victims demonstrated an organized rhythm 60 seconds after shock delivery; it is likely that even fewer had effective perfusion at that point. Therefore, CPR may be needed for several minutes following defibrillation until adequate perfusion is present.

Rescuers can use a computerized device called an AED to analyze the victim's rhythm and deliver a shock if the victim has VF or rapid VT. The AED uses audio and visual prompts to guide the rescuer. It analyzes the victim's rhythm and informs the rescuer if a shock is needed. AEDs are extremely accurate and will deliver a shock only when VF (or its precursor, rapid VT) is present.

Successful rescuer actions at the scene of an SCA are time critical. Several studies have shown the beneficial effects of immediate CPR and the detrimental impact of delays in defibrillation on survival from SCA. For every minute without CPR, survival from witnessed VF SCA decreases 7% to 10%. When bystander CPR is provided, the decrease in survival is more gradual and averages 3% to 4% per minute from collapse to defibrillation. CPR has been shown to double or triple survival from witnessed SCA at many intervals to defibrillation.

Public access defibrillation and first-responder AED programs may increase the number of SCA victims who receive bystander CPR and early defibrillation, improving survival from out-of-hospital SCA. These programs require an organized and practiced response with rescuers trained and equipped to recognize emergencies, activate the EMS system, provide CPR, and use the AED. Lay rescuer AED programs in airports, on airplanes, in casinos, and in first-responder programs with police officers have achieved survival rates as high as 49% to 75% from out-of-hospital witnessed VF SCA with provision of immediate bystander CPR and defibrillation within 3 to 5 minutes of collapse. These high survival rates, however, may not be attained in programs that fail to reduce time to defibrillation.

Medical Control

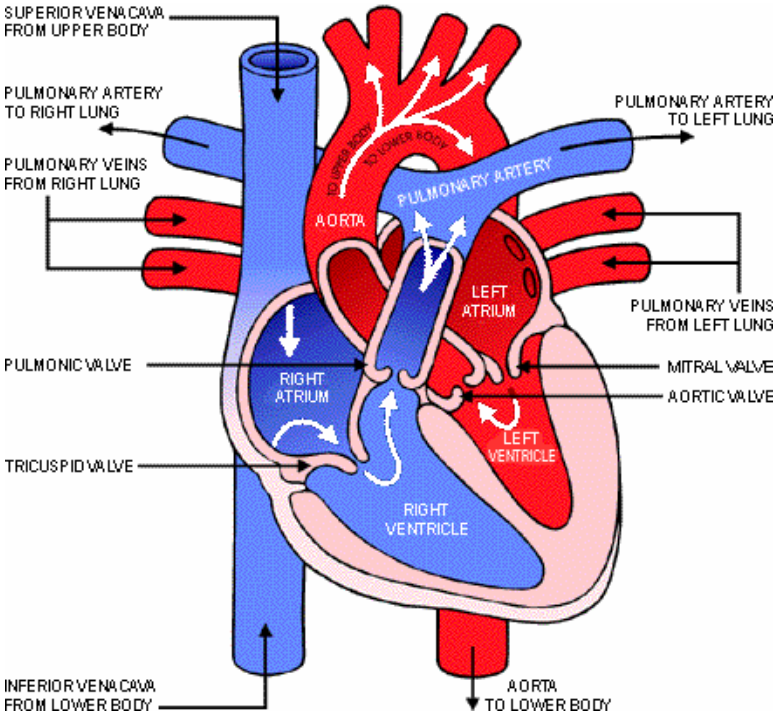
In cardiac arrest, time is critical. Delaying treatment to call for orders reduces the patient's chance of survival. Therefore, CPR and defibrillation must be performed **immediately** without a delay to contact Medical Control.

The medical control physician "on duty" is responsible for in-field defibrillation and must authorize treatment by signing the PPCR filled out by the provider after the event. All calls should be reviewed by the agency quality improvement program. A completed PPCR form is an essential element of this review process.

Cardiovascular Anatomy

The cardiovascular system has the vital task of transporting oxygen-containing blood to all parts of the body. If malfunction of this system causes blood flow to cease for more than a few minutes, irreversible brain damage may result.

The hollow, muscular heart propels blood forward through the body's complex system of blood vessels. The heart is really a "double" pump. The right side of the heart collects "used" blood from the body and pumps it into the lungs where oxygen is picked up and gaseous wastes are given off (respiration). Then, oxygen-rich blood flows into the left side of the heart. From there, it is pumped into the general circulation and delivered to the organs and tissues.



The two sides of the heart work together simultaneously as one pump:

Blood enters the heart through the two "upper" chambers, the right atrium and the left atrium.

These two thin-walled cavities direct blood flow into the two muscular "lower" chambers, the right ventricle and the left ventricle.

The two ventricles are the actual "pumps" that propel blood out of the heart and into the blood vessels.

One-way valves separate the upper and lower chambers and prevent the backward flow of blood. Valves also prevent blood from rushing back into the two ventricles after it has been pumped out into the major vessels.

There are two phases of heart activity:

1. **Diastole** is the relaxation phase when the heart fills with blood. Moments before the heart contracts, the two atria constrict and squeeze their blood into the ventricles.
2. **Systole** is the active pumping phase when both ventricles contract and push blood out of the heart.

Cardiac Electrophysiology

The heart is made of three different types of cells:

1. **Pacemaker cells** initiate electrical impulses and are responsible for the regular rhythm and rate of the heart.
2. **Conduction system cells** transmit the electrical impulses to specific regions of the heart.
3. **Cardiac muscle cells** contract after being stimulated by the electrical impulses and provide for the pumping action of the heart.

Under normal circumstances, pacemaker cells in the right atrium initiate all cardiac electrical impulses in a regular, rhythmic fashion. These impulses are rapidly transmitted along the special pathways made up of conduction system cells. When an impulse reaches cardiac muscle cells in the atria and ventricles, contraction results in an organized fashion. If electrodes are placed on a patient's chest, cardiac electrical impulses can be recorded on paper as an electrocardiogram (ECG).

Cardiac Arrest

Dysrhythmias are abnormal heart rhythms. They occur when cardiac electrical impulses become disorganized. Although many dysrhythmias do not upset the organized pumping action of the heart, a few "lethal" dysrhythmias may do so. If the heart suddenly ceases to pump because of a “lethal” dysrhythmia, the patient experiences cardiac arrest typified by:

- loss of consciousness
- loss of the pulse
- loss of respirations

The most common lethal dysrhythmia is ventricular fibrillation (VF). With VF, there is complete loss of normal pacemaker activity. Instead, multiple disorganized electrical impulses fire within the two ventricles, creating a chaotic wave pattern on the ECG. VF causes a sudden loss of the heart's ability to function as a pump. All blood flow halts, and the patient collapses. Brain death may follow within minutes if ventricular fibrillation is not terminated quickly.

CPR

Most victims of SCA demonstrate ventricular fibrillation (VF) at some point in their arrest. Several phases of VF have been described, and resuscitation is most successful if defibrillation is performed in about the first five minutes after collapse. Because the

interval between call to the emergency medical services (EMS) system and arrival of EMS personnel at the victim's side is typically longer than 5 minutes, achieving high survival rates depends on a public trained in CPR and on well-organized public access defibrillation programs.

CPR is important both before and after shock delivery. When performed immediately after collapse from VF SCA, CPR can double or triple the victim's chance of survival if an AED is not available. CPR should be provided until an AED or manual defibrillator is available. *After about five minutes of VF with no treatment, outcome may be better if shock delivery is preceded by a period of CPR with effective chest compressions that deliver some blood to the coronary arteries and brain*. CPR is also important immediately after shock delivery; most victims demonstrate asystole or pulseless electrical activity (PEA) for several minutes after defibrillation. CPR can convert these rhythms to a perfusing rhythm.

Not all adult deaths are due to SCA and VF. An unknown number have an asphyxial mechanism, as in drowning or drug overdose. Asphyxia is also the mechanism of cardiac arrest in most children, although about 5% to 15% have VF. Studies in animals have shown that the best results for resuscitation from asphyxial arrest are obtained by a combination of chest compressions and ventilations, although chest compressions alone are better than doing nothing.

Summary of Major CPR Guidelines

- Focus on providing high-quality CPR with special attention to chest compression depth and rate, permitting complete chest wall recoil and minimal interruptions to compressions.
- All rescuers acting alone should use a 30:2 ratio of compressions-to-ventilations for all victims except newborns.
- Health-care providers performing two-rescuer CPR for adults should use a 30:2 compression-to-ventilation ratio when there is no advanced airway in place.
- Health-care providers performing two-rescuer CPR for infants and children should use a 15:2 compression-to-ventilation ratio when there is no advanced airway in place.
- Compressions are given at a rate of 100 per minute with complete relaxation of pressure on the chest wall after each compression.
- Once an advanced airway is in place (e.g. endotracheal tube or CombiTube), continuous chest compressions are given at 100/minute with one ventilation every six to eight seconds (8–10 ventilations per minute). The ventilations are given without pausing chest compressions.
- Each rescue breath should be given over one second.
- If a jaw thrust without head extension does not open the airway for an unresponsive trauma victim with suspected cervical spine injury, use the head tilt–chin lift maneuver.
- For infant and child victims, health-care providers may, if needed, try "a couple of times" to reopen the airway and deliver effective breaths (i.e., breaths that produce visible chest rise).
- Avoid over-ventilation: too many breaths per minute or breaths that are too large or too forceful.

- When two or more health-care providers are present during CPR, rescuers should rotate the compressor role every two minutes.

Defibrillation

Early defibrillation is critical to survival from sudden cardiac arrest (SCA) for several reasons:

- The most frequent initial rhythm in witnessed SCA is ventricular fibrillation (VF).
- The treatment for VF is electrical defibrillation
- The probability of successful defibrillation diminishes rapidly over time.
- VF tends to deteriorate to asystole within a few minutes.

To treat VF SCA, rescuers must be able to rapidly integrate CPR with use of the AED. For EMS providers to give the victim the best chance of survival, two actions must occur within the first moments of a cardiac arrest: provision of CPR and operation of an AED.

Shock First Versus CPR First

When any rescuer witnesses an out-of-hospital arrest and an AED is immediately available on-scene, the rescuer should use the AED as soon as possible. Healthcare providers who treat cardiac arrest in hospitals and other facilities with AEDs on-site should provide immediate CPR and should use the AED/defibrillator as soon as it is available. These recommendations are designed to support early CPR and early defibrillation, particularly when an AED is available within moments of the onset of SCA.

When an out-of-hospital cardiac arrest is not witnessed by EMS personnel, give about 5 cycles of CPR before analyzing the ECG rhythm and attempting defibrillation. One cycle of CPR consists of 30 compressions and 2 breaths. When compressions are delivered at a rate of about 100 per minute, 5 cycles of CPR should take roughly 2 minutes.

1-Shock Protocol versus 3-Shock Sequence

Studies have shown the rhythm analysis for a 3-shock sequence performed by commercially available AEDs results in delays of up to 37 seconds between delivery of the first shock and delivery of the first post-shock compression. This delay is difficult to justify in light of the first-shock efficacy of greater than 90% reported by current biphasic defibrillators. If 1 shock fails to eliminate VF, the incremental benefit of another shock is low, and resumption of CPR is likely to confer a greater value than another shock. Data from studies documenting harmful effects from interruptions to chest compressions, suggests that a 1-shock scenario plus immediate CPR is reasonable.

When VF/pulseless ventricular tachycardia (VT) is present, the rescuer should deliver 1 shock and should then immediately resume CPR, beginning with chest compressions. The rescuer should not delay resumption of chest compressions to recheck the rhythm or pulse. After 5 cycles (about 2 minutes) of CPR, the AED should then analyze the cardiac rhythm and deliver another shock if indicated. If a nonshockable rhythm is detected, the AED should instruct the rescuer to resume CPR immediately, beginning with chest compressions.

If a biphasic defibrillator is available, providers should use the dose at which that defibrillator has been shown to be effective for terminating VF (typically a selected energy of 120 J to 200 J). If the provider is unaware of the effective dose range of the device, the rescuer may use a dose of 200 J for the first shock and an equal shock dose for the second and subsequent shocks. If a monophasic defibrillator is used, providers should deliver an initial shock of 360 J and use that dose for subsequent shocks. By default, the CSEMS protocols use 360 J as the shock dose.

EMS providers must practice efficient coordination between CPR and defibrillation. When VF is present for more than a few minutes, the myocardium is depleted of oxygen and metabolic substrates. A brief period of chest compressions can deliver oxygen and energy substrates, increasing the likelihood that a perfusing rhythm will return after defibrillation (elimination of VF). Analyses of VF waveform characteristics predictive of shock success have documented that the shorter the time between a chest compression and delivery of a shock, the more likely the shock will be successful. Reduction in the interval from compression to shock delivery by even a few seconds can increase the probability of shock success.

The rescuer providing chest compressions should minimize interruptions in chest compressions for rhythm analysis and shock delivery and should be prepared to resume CPR, beginning with chest compressions, as soon as a shock is delivered. When 2 rescuers are present, the rescuer operating the AED should be prepared to deliver a shock as soon as the compressor removes his or her hands from the victim's chest and all rescuers are "clear" of contact with the victim. The lone rescuer should practice coordination of CPR with efficient AED operation.

Summary of Major AED Guidelines

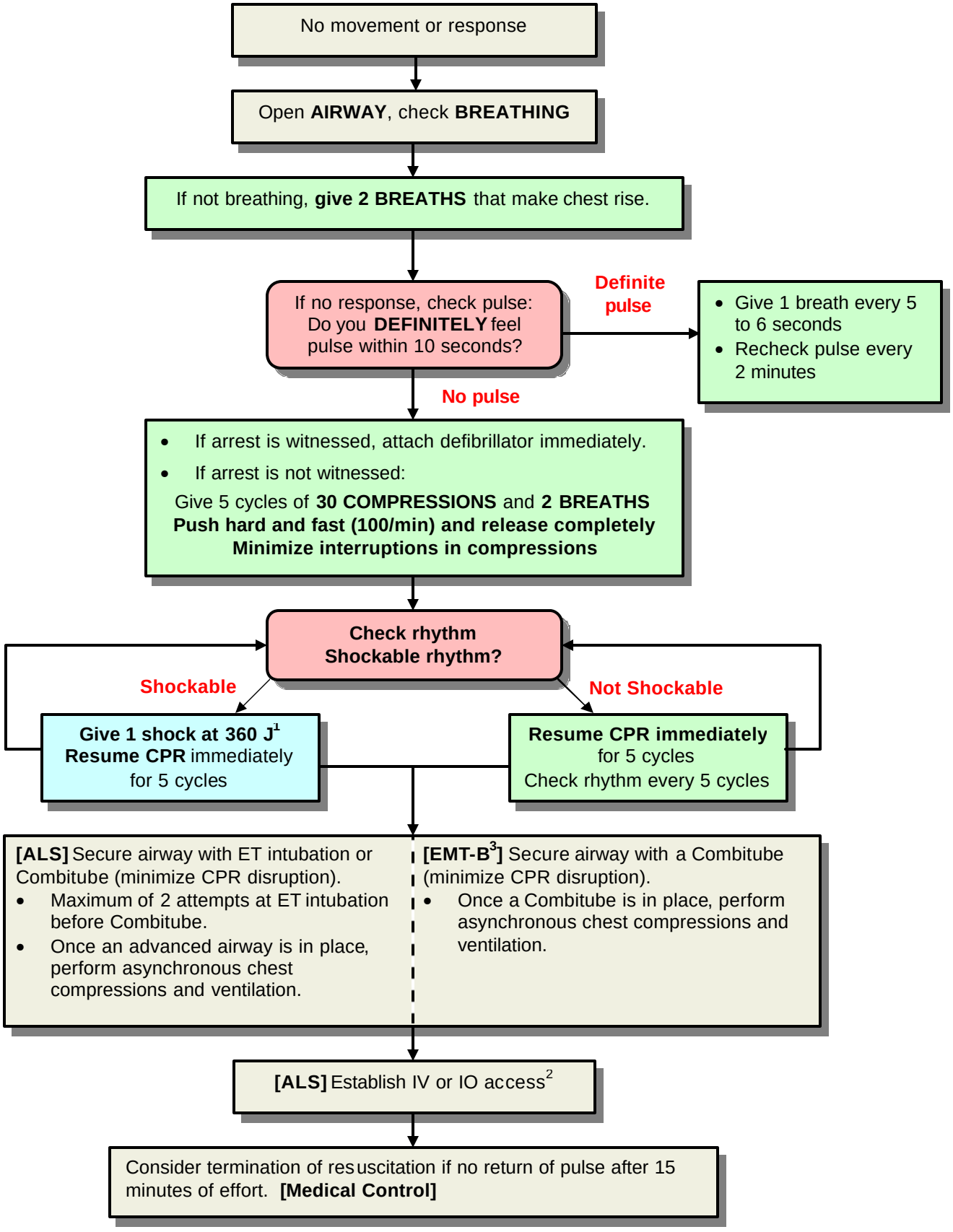
- Use a child dose-reduction system with AEDs (e.g. pediatric pads/cable), when available, for children from one to eight years old.
- For victims of ventricular fibrillation (VF) cardiac arrest, use a single shock, followed by immediate CPR for two minutes, starting with compressions first.
- For adult out-of-hospital cardiac arrest that is not witnessed by the EMS provider, rescuers give a period of CPR (about two minutes) before checking the rhythm and attempting defibrillation.
- During cardiac arrest, rescuers should analyze the victim's rhythm about every two minutes. This will be after about five cycles of CPR for an adult victim with no advanced airway in place.

Documentation

A PPCR and/or other approved form shall be completed in compliance with standard documentation procedures. The following pertinent information should be included:

Witnessed or non-witnessed arrest.
Time of event.
Time to CPR initiated.
Time of AED use initiated.
Number of shocks delivered.

Airway management method.
Availability of ALS.
Time medical control notified.
Patient outcome.
Physician signature.


No movement or response
Open **AIRWAY**, check **BREATHING**
If not breathing, **give 2 BREATHS** that make chest rise.
If no response, check pulse: Do you **DEFINITELY** feel pulse within 10 seconds?
Definite pulse
• Give 1 breath every 5 to 6 seconds
• Recheck pulse every 2 minutes
No pulse
• If arrest is witnessed, attach defibrillator immediately.
• If arrest is not witnessed:
Give 5 cycles of **30 COMPRESSIONS** and **2 BREATHS**
Push hard and fast (100/min) and release completely
Minimize interruptions in compressions
Check rhythm
Shockable rhythm?
Shockable
Not Shockable
Give 1 shock at 360 J[1]
Resume CPR immediately for 5 cycles
Resume CPR immediately for 5 cycles
Check rhythm every 5 cycles
[ALS] Secure airway with ET intubation or Combitube (minimize CPR disruption).
• Maximum of 2 attempts at ET intubation before Combitube.
• Once an advanced airway is in place, perform asynchronous chest compressions and ventilation.
[EMT-B[3]] Secure airway with a Combitube (minimize CPR disruption).
• Once a Combitube is in place, perform asynchronous chest compressions and ventilation.
[ALS] Establish IV or IO access[2]
Consider termination of resuscitation if no return of pulse after 15 minutes of effort. **[Medical Control]**

[1] If a biphasic defibrillator is available, providers should use the dose at which that defibrillator has been shown to be effective for terminating VF (typically a selected energy of 120 J to 200 J). If the provider is unaware of the effective dose range of the device, the rescuer may use a dose of 200 J for the first shock and an equal shock dose for the second and subsequent shocks. If a monophasic defibrillator is used, providers should deliver an initial shock of 360 J and use that dose for subsequent shocks. By default, the CSEMS protocols will use 360 J as the shock dose.

[2] Intraosseous access may not be performed by EMT-Enhanced providers.

[3] Only EMT-B providers that have successfully completed local protocol training on the Combitube airway are authorized to utilize the device.

Key Points: CARDIAC ARREST (AED) – ADULT

- The foundation of ALS care is good BLS care, beginning with prompt high-quality CPR and, for VF/pulseless VT, attempted defibrillation within minutes of collapse as soon as it can be accomplished.
- The most critical interventions during the first minutes of VF or pulseless VT are immediate CPR, with minimal interruption in chest compressions, and defibrillation.
- If the arrest is not witnessed, give 5 cycles of CPR before attempting defibrillation.
- When a rhythm check reveals VF/VT, CPR should be provided while the defibrillator charges (when possible), until it is time to "clear" the victim for shock delivery. Give the shock as quickly as possible. Immediately after shock delivery, resume CPR (beginning with chest compressions) without delay and continue for 5 cycles (or about 2 minutes if an advanced airway is in place), and then check the rhythm.
- Minimize the number of times that chest compressions are interrupted.
- "Effective" chest compressions are essential for providing blood flow during CPR. To give "effective" chest compressions, "push hard and push fast." Compress the adult chest at a rate of about 100 compressions per minute, with a compression depth of 1 ½ to 2 inches (approximately 4 to 5 cm). Allow the chest to recoil completely after each compression, and allow approximately equal compression and relaxation times.
- Resuscitation may be terminated by BLS or ALS providers under the direction of **[Medical Control]**.

AED SKILL SHEET (Arrest NOT WITNESSED – 2 Rescuer)

Candidate: _____ Examiner: _____ Date: _____

	Required	Earned
ASSESSMENT – TREATMENT		
Checks for response	**1**	
Calls for AED	**1**	
Opens airway using head tilt-chin lift	**1**	
Checks breathing *(Minimum 5 seconds; maximum 10 seconds)*	**1**	
Gives 2 breaths *(1 second each)*	**1**	
Checks carotid pulse *(Minimum 5 seconds; maximum 10 seconds)*	**1**	
Locates CPR hand position	**1**	
Delivers first cycle of compressions	**1**	
Gives 2 breaths *(1 second each)*	**1**	
Delivers 4 more cycles of CPR	**1**	
Turns AED on	**1**	
Selects proper AED pads and places pads correctly	**1**	
Clears victim to analyze *(must be visible and verbal check)*	**1**	
Clears victim to shock/presses shock button *(must be visible and verbal check)*	**1**	
Resumes chest compressions after 1 shock	**1**	
Delivers 5 cycles of CPR	**1**	
Clears victim to analyze *(must be visible and verbal check)*	**1**	
Clears victim to shock/presses shock button *(must be visible and verbal check)*	**1**	
Resumes chest compressions after 1 shock	**1**	
INTEGRATION		
Gathers additional information about the arrest event	**1**	
Confirms effectiveness of CPR (ventilation and compressions)	**1**	
Rotates chest compressors every 5 cycles or 2 minutes	**1**	
Assures high concentration of oxygen is delivered to the patient	**1**	
Assures CPR continues without unnecessary/prolonged interruption	**1**	
DISPOSITION		
Verbalizes appropriate disposition of the patient based on patient condition	**1**	
Passing Score: 20 points **Total:**	**25**	

Critical Criteria:

_____ Did not direct initiation/resumption of ventilation/compressions at appropriate times.

_____ Did not assure all individuals were clear of patient before delivering each shock.

_____ Did not operate the AED properly (inability to deliver shock)

_____ Prevented the defibrillator from delivering indicated stacked shocks.

AED SKILL SHEET (Arrest WITNESSED – 2 Rescuer)

Candidate: _____ Examiner: _____ Date: _____

	Required	Earned
ASSESSMENT – TREATMENT		
Checks for response	**1**	
Calls for AED *(AED is immediately available)*	**1**	
Opens airway using head tilt-chin lift	**1**	
Checks breathing *(Minimum 5 seconds; maximum 10 seconds)*	**1**	
Gives 2 breaths *(1 second each)*	**1**	
Checks carotid pulse *(Minimum 5 seconds; maximum 10 seconds)*	**1**	
Turns AED on	**1**	
Selects proper AED pads and places pads correctly	**1**	
Clears victim to analyze *(must be visible and verbal check)*	**1**	
Clears victim to shock/presses shock button *(must be visible and verbal check)*	**1**	
Initiates chest compressions after 1 shock	**1**	
Locates CPR hand position	**1**	
Delivers first cycle of compressions	**1**	
Gives 2 breaths *(1 second each)*	**1**	
Delivers 4 more cycles of CPR	**1**	
Delivers 5 cycles of CPR	**1**	
Clears victim to analyze *(must be visible and verbal check)*	**1**	
Clears victim to shock/presses shock button *(must be visible and verbal check)*	**1**	
Resumes chest compressions after 1 shock	**1**	
INTEGRATION		
Gathers additional information about the arrest event	**1**	
Confirms effectiveness of CPR (ventilation and compressions)	**1**	
Rotates chest compressors every 5 cycles or 2 minutes	**1**	
Assures high concentration of oxygen is delivered to the patient	**1**	
Assures CPR continues without unnecessary/prolonged interruption	**1**	
DISPOSITION		
Verbalizes appropriate disposition of the patient based on patient condition	**1**	
Passing Score: 20 points **Total:**	**25**	

Critical Criteria:

_____ Did not direct initiation/resumption of ventilation/compressions at appropriate times.

_____ Did not assure all individuals were clear of patient before delivering each shock.

_____ Did not operate the AED properly (inability to deliver shock)

_____ Prevented the defibrillator from delivering indicated stacked shocks.